

ADVANCE PROGRAM



1998 IEEE Radio and Wireless Conference

Sheraton Colorado Springs

Colorado Springs, Colorado, USA

August 9-12, 1998

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General Chair:

Dr. Roger Marks, *National Institute of Standards and Technology*

Technical Program Chair:

Dr. Michael S. Heutmaker, *Lucent Technologies*



1998 IEEE Radio and Wireless Conference

MONDAY, AUGUST 10, 1998

Opening and Keynote Address

1:00-1:40 PM

Co-Chair: Roger B. Marks, General Chair, RAWCON'98

Co-Chair: Michael S. Heutmaker, Technical Program Chair, RAWCON'98

Keynote Address: "Technical Challenges to LMDS Implementation"

Barclay Jones, *WNP Communications, Inc.*

Session M1

Broadband Wireless System Concepts

1:40 PM - 3:00 PM

Chair: Modest Oprysko, *IBM T.J. Watson Research Center*

LMDS in the Broadband Local Loop—
Alternatives and Issues

Aftab Ahmad, Ki-Seon Kim, Song In-Jong,
*Kwangju Institute of Science and Technology,
Kwangju, Korea*

MM-Wave Wireless Access Technology for the
Wideband Wireless Local Loop Applications
Hossein Izadpanah, Daniel Gregoire, Jim
Schaffner, H. P. Hsu, *HRL Laboratories,
Malibu, CA*

Broadband Data Services from a HALO
Aircraft

Peter Diamandis, *Angel Technologies Corp., St.
Louis, MO*

Transmission Techniques for Increased
Power Efficiency in OFDM-Based Wireless
Communication Systems

Rui Dinis, Antonio Gusmao, *Technical Uni-
versity of Lisbon, Lisbon, Portugal*

Break 3:00 PM - 3:30 PM

Session M2

System Architecture and Networking

3:30 PM - 5:10 PM

Chair: Kari-Pekka Estola, *Nokia Research Ctr.*

Cellular Network Design and Smart
Antenna Systems

Mark Reudink, Loan Duong, *Metawave Com-
munications Corp., Redmond, WA*

A New Throughput Analysis of a Novel
CDMA-Based Protocol for Wireless LANs
Peter E. Omiyi, Timothy O'Farrell, *University
of Leeds, Leeds, England*

Comparison of FH/CDMA and DS/CDMA
for Wireless Survivable Networks

Scott Chuprun, Chad Bergstrom, *Motorola
SSTG, Scottsdale, AZ*

Dynamic Router Configuration Manage-
ment for Wireless Mobile Environments

Sidarth Ambardar, *MITRE Corporation,
Reston, VA*

A FDM Multiple User Software Configurable
Arbitrary Format (MUSCAF) UHF Receiver
Prototype

Ian Scott, *Minilinx, Perth, Australia*

Poster Session MA and Reception (*see insert*)

5:30 PM - 7:30 PM

Banquet 7:30 PM - 9:30 PM

Banquet Speaker: Larry Irving, head of the
U.S. National Telecommunications and
Information Administration (NTIA)

TUESDAY, AUGUST 11, 1998

Session T1

System Modeling and Measurement

8:00 AM - 9:20 AM

Chair: R. E. Ziemer, *University of Colorado at
Colorado Springs*

Bit Error Rate Analysis in Wireless Systems
Modeling

George Chrisikos, Christopher J. Clark, *Uni-
versity of Southern California, Los Angeles, CA*

Performance of an Adaptive Rate Modem
Using Quasi-Analytic Simulation Techniques
Peter M. Hofstetter, Mark A. Wickert, *Univer-
sity of Colorado at Colorado Springs, Colorado
Springs, CO*

Transmission Capacity of a Broadband
Wireless Radio Link

Jose Fernandes, *Universidade de Aveiro, Aveiro,
Portugal*

Cellular System Performance Prediction

Ron Rudokas, *Littleton, CO*

Break 9:20 AM - 9:50 AM

Session T2

System Optimization

9:50 AM - 11:50 AM

Chair: Mark Wickert, *University of Colorado
at Colorado Springs*

Toward the 60 gm Wireless Phone
David Smithgall, *Lucent Technologies,
Princeton, NJ*

Comparison of Antenna Diversity Schemes
B. Gavilanes-Loureiro, I. De Coster, E. Van
Lil, F. Perez-Fontan, *Katholieke Universiteit
Leuven, Heverlee, Belgium*

Spatio-Temporal Equalization for Wireless
Communication

Joshua Alspector, John D. Norgard,
*University of Colorado at Colorado Springs,
Colorado Springs, CO*

Optimal Hybrid Frequency Hop Communi-
cation System Using Nonlinear Adaptive
Jammer Countermeasures and Active Fading
Mitigation

Chad S. Bergstrom, J. Scott Chuprun,
Motorola SSTG, Scottsdale, AZ

Smart Channel Assignment Algorithm for
SDMA Systems

Flavio Piolini, Anna Rolando, *CSELT, Torino,
Italy*

MAI Cancellation by Optimum Single-User
Detection for DS/CDMA Systems Using
Random Binary Codes

Naresh R. Patel, Timothy O'Farrell, *The Uni-
versity of Leeds, Leeds, England*

Lunch 12:00 - 1:00 PM

Session T3

CDMA System Performance

1:00 PM - 2:40 PM

Chair: Seng-Woon Chen, *Polanyi, Inc.*

The Application of Low Noise Amplifiers in
CDMA Cellular and PCS Systems for
Coverage and Capacity Enhancements
Samuel Yang, *AirTouch Cellular, Irvine, CA*

IS-95 CDMA Forward Link Optimization Tool
John Payne, Asim Qureshi, *AirTouch Cellular,
Irvine, CA*

Simulation of Coded MC-DS-CDMA Systems
Thad B. Welch, Rodger E. Ziemer, *United
States Naval Academy, Annapolis, MD*

Analysis of Impact on Handset Transmitter
Design of the High-Speed Data Require-
ments in the IS-95-B CDMA Wireless
Standard

Giridhar Mandyam, *Texas Instruments Inc.,
Dallas, TX*

Effects of Carrier Tracking in RAKE
Reception of Wideband DSSS

R. E. Ziemer, L. R. Milstein, B. R. Vojcic,
J. G. Proakis, *University of Colorado at
Colorado Springs, Colorado Springs, CO*

Poster Session TA (*see insert*)

2:40 PM - 3:10 PM (Refreshments Served)

(continues)

Session T4

Antenna Design and Performance

3:10 PM - 4:30 PM

Chair: Ronald DeLyser, *University of Denver*

A Novel Approach for Gain and Bandwidth Enhancement of Patch Antennas

Yongxi Qian, Dan Sievenpiper, Vesna Radisic, Eli Yablonovitch, Tatsuo Itoh, *University of California, Los Angeles, Los Angeles, CA*

Performance of Lens Antennas in Wireless Indoor Millimeter Wave Applications

Carlos Fernandes, Jose Fernandes, *Instituto de Telecomunicacoes - IST, Lisboa, Portugal*

Statistical Behavior and Performance of Adaptive Antennas in Multipath Environments

Tien D. Pham, *University of Toronto, Toronto, Canada*

On Applications of Self-Phased Array Antennas to Mobile Communications

Sergey L. Loyka, Vladimir I. Mordachev, *Belorussian State University of Informatics & Radioelectronics, Minsk, Belarus*

Poster Session TB and Reception 5 - 7 PM
(see insert)

Panel Discussion Session 7 - 9 PM

WEDNESDAY, AUGUST 12, 1998

Session W1

Propagation Modeling

8:00 AM - 9:20 AM

Chair: Christopher Holloway, *ITS*

Frustum Ray Tracing Technique for High Spatial Resolution Channel Characteristic Map

Hajime Suzuki, Ananda Mohan, *University of Technology, Sydney, Australia*

VHF Space-to-Earth Radio Link Performance in Man-Made Noise

Robert J. Achatz, Roger Dalke, *Institute for Telecommunication Sciences, Boulder, CO*

Reception Algorithms for Ray Launching Modeling of Indoor Propagation

Santiago J. Flores, Luis F. Mayorgas, Francisco A. Jimenez, *Escuela Universitaria Gandia, Gandia, Spain*

Radio-Channel Propagation Prediction in Urban Micro and Picocellular Environment

Farshid Aryanfar, J. Rashed-Mohassel, S. Safavi-Naeini, *Tehran University, Tehran, Iran*

Poster Session WA (see insert)

9:20 AM - 9:50 AM (Refreshments Served)

Session W2

Integrated Passive Devices

9:50 AM - 11:50 AM

Chair: Charles Hodges, *Flextronics Intl.*

Advanced Silicon IC Interconnect Technology: Present Trends and RF Wireless Implications

Ronald Gutmann, *Rensselaer Polytechnic Institute, Troy, NY*

Advanced Packaging of Integrated Passive Devices for RF Applications

Elizabeth A. Logan, Howard M. Clearfield, James L. Young, *Intarsia Corporation, Fremont, CA*

Flip-Chip Assembly for RF MEMS

Ronda S. Irwin, Wenge Zhang, Kevin F. Harsh, Y.C. Lee, *University of Colorado, Boulder, CO*

Partially-Interdigitated Compline Filter

Reddy Vangala, *Motorola Inc., Albuquerque, NM*

An Improved Lumped-Elements Equivalent Circuit for on Silicon Integrated Inductors

P. Arcioni, R. Castello, L. Perregrini, E. Sacchi, F. Svelto, *Universita Di Pavia, Pavia, Italy*

Spiral Inductor Substrate Loss Modeling in Silicon RFICS

William B. Kuhn, Naveen K. Yanduru, *Kansas State University, Manhattan, KS*

Lunch 12:00 - 1:00 PM

Session W3

Power Amplifiers and Digital Modulation

1:00 PM - 2:40 PM

Chair: Gene Tkachenko, *Alpha Industries*

Application of RF LDMOS Power Transistors for 2.2GHz Wideband-CDMA

Alan Wood, Warren Brakensiek, *Motorola Wireless Infrastructure Product Group, Phoenix, AZ*

Highly Efficient Linear Power Amplifier for 3.5 Volt NADC Cellular Applications

J. Staudinger, G. Norris, R. Sherman, G. Sadowiczak, *Motorola Semiconductor Products Sector, Tempe, AZ*

A New Circuit Topology to Realize High Efficiency, High Linearity, and High Power Microwave Amplifiers

David M. Upton, Peter R. Maloney, *Mayflower Communications Company, Inc, Billerica, MA*

GaAs HBT Power Amplifier with Smooth Gain Control Characteristics

Esko Jarvinen, *Nokia Research Center, Helsinki, Finland*

Linearization Performance for a Polar Work Function Predistorter

Claudio Rey, Eugene Clark, *Spectrian Corporation, Sunnyvale, CA*

Poster Session WB (see insert)

2:40 PM - 3:10 PM (Refreshments Served)

Session W4

Active Device Modeling

3:10 PM - 4:50 PM

Chair: Masami Akaike, *Science University of Tokyo*

An Examination of Several Large Signal Capacitance Models to Predict GaAs HEMT Linear Power Amplifier Performance

J. Staudinger, M. C. de Baca, R. Vaitkus, *Motorola Semiconductor Products Sector, Tempe, AZ*

Small-Signal and Noise Modeling of Submicrometer High Speed Bipolar Transistor

S. Rinaudo, G. Privitera, G. Ferla, A. Galluzzo, *SGS-Thomson Microelectronics, Catania, Italy*

BSIM3 MOSFET Model Accuracy for RF Circuit Simulation

Suet F. Tin, Ashraf A. Osman, Kartikeya Mayaram, Chenming Hu, *Washington State University, Pullman, WA*

Table-Based FET Model Assembled From Small-Signal Models

C.J. Wei, Y. A. Tkachenko, D. Bartle, *Alpha Industries Inc, Woburn, MA*

Electrical Modeling of Packages for High Power RF Semiconductor Devices

Tao Liang, Jaime Pla, Mali Mahalingam, *Motorola Wireless Infrastructure Systems Division, Phoenix, AZ*

Registration Hours

Sunday, August 9

7 am - 7 pm

Monday, August 10

7 am - 5 pm

Tuesday, August 11

7 am - 7 pm

Wednesday, August 12

7 am - noon

POSTER SESSIONS

MONDAY, AUGUST 10, 1998

Session MA

Wireless/RF Technology

5:30 PM - 8:00 PM

Chairs: Mohammad Shakouri, David Smithgall, *Lucent Technologies*

System Architecture Posters

An IF Digitizing Receiver for a Combined GPS/GSM Terminal

K. Boehm, T. Hentschel, T. Mueller, F. Oehler, G. Rohmer, *DaimlerBenz Research, Ulm, Germany*

Ultra High Speed Digital Processing for Wireless Systems Using Passive Microwave Logic

S. Abraham, C. Gracia, B. Krishnamachari, S. Lok, *Cooper Union, New York, NY*

A Wireless Data System Constructed of SAW-Based Receiver/Transmitter and Its Applications to Medical Cares

Kenji Matsumura, Gen Fujita, Isao Shirakawa, Hiroshi Inada, *Osaka University, Osaka, Japan*

Networking/Protocol Posters

Outage Performance Analysis for Cellular Systems in a Lognormal Shadowed Nakagami Fading Environment
WITHDRAWN

Analysis of Random Cellular Systems

Timothy X. Brown, *University of Colorado, Boulder, CO*

System Capacity, Latency, and Power Consumption in Multihop-routed SS-CDMA Wireless Networks

Matthew Ettus, *Mountain View, CA*

A Mechanism for Matching Application Message Generation With Wireless Network Performance

Charlene Todd, Brian Rivera, *Motorola SSTG, Scottsdale, AZ*

Mobility Management for Wireless Systems with Unreliable Backhaul Links
WITHDRAWN

System Performance Posters

N Dimensional Orthogonal QPSK Signaling With Discrete Prolate Spheroidal Sequences
D. M. Gruenbacher, D. R. Hummels, *Kansas State University, Manhattan, KS*

System Performance Analysis of Impulse Radio Modulation
Fernando Ramirez-Mireles, *Wireless Access, Los Angeles, CA*

In-Band Intermodulation Measurement and Simulation of a Local Multipoint Distribution System
Thomas Wong, *Illinois Institute of Technology, Chicago, IL*

Noise in Self-timed and Synchronous Implementations of a DSP
W. A. Lien, P. Day, C. Farnsworth, R. Glibbery, D. L. Jackson, J. Liu, N. C. Paver, K. Kozma, J. Chappel, *Cogency Technology Inc., Toronto, Canada*

Wideband Radio Prototyping Environment
Tommi Makelainen, Timo Eriksson, Jarkko Posti, Risto Suoranta, *Nokia Research Center, Helsinki, Finland*

Digital Single Side Band (DSSB) with Pilot Symbol Assisted Modulation (PSAM) in Mobile Radio
Seungwon Kim, Leon W. Couch, *University of Florida, Gainesville, FL*

Antenna/Propagation Posters

Characterization of Bunny-Ear Antennas for Wireless Basestation Applications
Marc C. Greenberg, Kathleen L. Virga, *University of Arizona, Tucson, AZ*

Effect of Tilted Base-station Antennas on Cochannel Interference Reduction in Cellular Communications
Ting-Kai Qin, Xin Zhang, Yong Cheng, *Nanjing University of Posts & Telecommunications, Nanjing, China*

Electronic Beam Tilting of Base Station Antenna: Rotman Lens Fed
S. G. Kim, S. M. Park, C. W. Ro, J. M. Lee, *Gamma Nu Wave, Inc., Suwon, Korea*

An Improved 3D Ray Tracing Method for Indoor Propagation Prediction
W. Lu, K. T. Chan, *Chinese University of Hong Kong, Hong Kong*

Miniature Dielectric-loaded Personal Telephone Antennas with Low SAR
Bernhard Rosenberger, *Rosenberger Hochfrequenztechnik, Tittmoning, Germany*

A Practical Approach to Wideband Antenna Array Characterization

S. London, V. Leonov, P. Koert, L. Susman, *Advanced Power Technologies, Inc., Washington, DC*

Passive Device Posters

Advanced Chip-in-Board Thin-film Hybrid Technology with Integrated Polyimide Film Capacitors for Ultra High-Speed and Millimeterwave Applications
Wolf-Dieter Nohr, Gerhad Hanke, Dieter-Jurgen Weber, *Deutsche Telekom, Berlin, Germany*

Characterization of Embedded Resistors for High Frequency Wireless Applications
Nanju Na, Kwang Lim Choi, Madhavan Swaminathan, *Georgia Institute of Technology, Atlanta, GA*

Active Device Posters

A PHEMT MMIC Broad-band Power Amplifier for LMDS
Young-Gi Kim, Sung-Jae Maeng, Jin-Hee Lee, Chul-Soon Park, *Anyang University, Anyang, Korea*

A Two Stage, Monolithic Integrated 200 mW HEMT Amplifier for Wireless ATM
Thomas A. Bos, Urs Lott, Werner Baechtold, *Swiss Federal Institute of Technology (ETH) Zurich, Zurich, Switzerland*

A 85 Mbps Low-Power DQPSK MODEM-LSI for Advanced Wireless Access
Akihiro Yamagishi, Masahiro Muraguchi, *NTT Wireless Systems Laboratories, Yokosuka, Japan*

An Integrated RF Transceiver for Short-Range, High-Speed Digital Communications in the U-NII 5.x GHz Band
Mehmet Soyuer, Herschel A. Ainspan, Joachim N. Burghartz, Jean-Olivier Plouchart, Brian P. Gaucher, Troy J. Beukema, Frank J. Canora, Erik Pilmanis, Modest M. Oprysko, *IBM T. J. Watson Research Center, Yorktown Heights, NY*

A High-Efficiency RF Transmitter Using VCO-Derived Synthesis: CALLUM
David J. Jennings, J. P. McGeenan, *University of Bristol, Bristol, United Kingdom*

(Continued on back)

TUESDAY, AUGUST 11, 1998

Session TA

Antenna Design

2:40 PM - 3:10 PM

Chair: Robert Achatz, *ITS*

Use of Prony's Method for Extracting the Poles and Zeros Yielding a Wideband Window Type Response of Circular Antenna Arrays

Fatma M. El-Hefnawi, *Electronics Research Institute, Cairo, Egypt*

Microstrip Bowtie Patch Antenna for Wireless Indoor Communications

C. H. Ng, S. Uysal, M. S. Leong, *The National University of Singapore, Singapore*

Beamforming Applied to an Adaptive Planar Array

Ana Maria Guerreiro, Adriaio Duarte Neto, Fabio Adriano, *Lisboa Rio Grande do Norte Federal University, Natal, Brazil*

A Dual-Polarized Microstrip Antenna Array with High Isolation Fed by Coplanar Network

ShiChang Gao, ShunShi Zhong, *Shanghai University, Shanghai, China*

Low-cost, Dual-band, Handset Antennas for LEOS Communications

James McLean, Gentry Crook, Siegfried Mikuteit, *Tactical Systems Research, Inc., Austin, TX*

Hotel and Travel

Sheraton Colorado Springs Hotel
2886 South Circle Drive
Colorado Springs, CO 80906
Phone: (719) 576-5900
Fax: (719) 576-7695

Please make your own reservations with the hotel. The conference rate is \$112 per night (single or double), plus tax. Rooms will be held only through the cutoff date of July 8, 1998, but the conference rate may be available afterwards.

The hotel is only seven miles from the Colorado Springs Airport and provides a free shuttle service. Driving time from Denver International Airport is 90 minutes.

Session TB

Signal Processing

5:00 PM - 7:00 PM

Chair: Jay Jacobsmeyer, *Pericle Communications Co.*

A New Real Time Radio Frequency Direction Finding Algorithm for Gaussian and Non-Gaussian Noise Environments

W. Featherstone, H. J. Strangeways, *University of Leeds, Leeds, England*

Harmonic Retrieval in Colored Non-Gaussian Noise Using Cumulant and Autocorrelation

Yan Zhang, Shu-Xun Wang, *Jilin University of Technology, Changchun, China*

The Use of Arbitrary Sequences for Real-Time Wireless Channel Evaluation

A. Al-Dabbagh, M. Darnell, *University of Leeds, Leeds, England*

Carrier Frequency Tracking for CPM Signal in a Direct Conversion Receiver

Hang Zhang, *Nokia Research Center, Helsinki, Finland*

Frequency-Domain Delay Distortion Equalization—The Complex Spectrum Regeneration Method

Masami Akaike, *Science University of Tokyo, Tokyo, Japan*

WEDNESDAY, AUGUST 12, 1998

Session WA

Passive Device Technology

9:20 AM - 9:50 AM

Chair: *to be announced*

Design Considerations for Extremely High-Q Integrated Inductors and Their Application in CMOS RF Power Amplifier

Tony Yeung, Jack Lau, H. C. Ho, M. C. Poon, *The Hong Kong University of Science & Technology, Hong Kong*

Microfabricated Single Crystal Silicon Transmission Lines

T. D. Kudrle, H. P. Neves, N. C. MacDonald, *Cornell University, Ithaca, NY*

Resonant Frequency of Dielectric Resonator

Juseop Lee, Young-Sik Kim, *Korea University, Seoul, Korea*

Design of an Integrated RF Filter for the Direct Digitization Front End of a Dual GPS/GLONASS Software Radio Receiver

Cornelius Brinegar, Krishna Naishadham, *Wright State University, Dayton, OH*

Modeling and Characterization of Wire Bonding and Taped Automatic Bonding. Analytical Formulas and Experimental Validation

N. Hassaine, Y. Shen, P. Ntake, *Harris Farinon Canada, Inc., Dollard-Des-Ormeaux, Canada*

Session WB

Active Device Technology

2:40 PM - 3:10 PM

Chair: Joseph Staudinger, *Motorola SPS*

MMIC-Based Class-A/F Power Amplifier for Ultra-Linear-Commercial PCS Multiple-Modulation-Format Base Station Power Amplification

David Helms, Martina Testa, Nelly Vladimisky, David Wills, *Celwave, Corvallis, OR*

A High Efficiency MMIC Power Amplifier for Phased Array Antenna Applications

Brian K. Kormanyos, Ronald W. Kruse, Debra R. Follensbee, *Boeing Space and Defense Group, Seattle, WA*

CAD of Microwave Integrated Multistage Active Filters by the Real Frequency Method

P. Jarry, E. Kerherve, *Bordeaux University, Talence, France*

Advanced TRL (Through-Reflect-Line) Fixture Design and Error Analyses for RF High Power Transistor Characterization and Automatic Load Pull Measurement

WITHDRAWN

Reception and Banquet

Monday, August 10, 1998 5:30 - 9:30 PM

Please join us for a reception and poster session from 5:30 - 7:30 PM on Monday. The banquet that follows will feature an address by Larry Irving, Assistant Secretary for Communications and Information, U. S. Department of Commerce and head of the National Telecommunications and Information Administration (NTIA).

FULL-DAY WORKSHOP

MODELING AND SIMULATION OF DEVICES AND CIRCUITS FOR WIRELESS COMMUNICATION SYSTEMS
 Sunday, August 9, 1998 8:00 AM - 5:00 PM

Organizer and Chair:
 John F. Sevic, *Spectrian Corp.*

Speakers:
 Jeff Jargon, *NIST*
 Steve Maas, *Nonlinear Technologies, Inc.*
 James Rautio, *Sonnet Software, Inc.*
 David Root, *Hewlett-Packard Co.*
 John F. Sevic, *Spectrian Corp.*
 Joe Staudinger, *Motorola, Inc.*
 Wayne Struble, *M/A-COM, Inc.*

Commercial RF and microwave CAD packages have evolved to the point where predictive simulation is possible. When properly applied, CAD can reduce design cycle-time and provide insight that bench techniques alone cannot. Virtual prototyping and statistical optimization are possible, precluding the necessity of time-consuming pilot runs. Unfortunately, many CAD users are unfamiliar with rigorous modeling and characterization techniques. The result is often user frustration and alienation. Ultimately, many CAD users return to bench methods.

The purpose of this workshop is to introduce basic modeling and characterization techniques for RF and microwave CAD. Experts will discuss how to use simulation to complement the design process for wireless communication circuits. The emphasis will be on learning when to use simulation to an advantage, how to interpret results, and how to establish confidence in the models. Attendees of the workshop will learn to trust simulation in order to make engineering decisions. A wide variety of topics will be covered, including simulation and modeling of passive lumped and distributed components, frequency-conversion circuits, and power amplifier circuits. Large-signal device modeling and characterization techniques will also be included. The appropriate simulation methods and models will be identified, and simulations will be compared to measurements.

RAWCON'98 Keynote Speaker

Keynote Address: "Technical Challenges to LMDS Implementation"
 Barclay Jones
 Chief Technical Consultant
WNP Communications, Inc.

HALF-DAY WORKSHOP

OVERVIEW OF CODING AND MODULATION FOR WIRELESS COMMUNICATIONS
 Monday, August 10, 1998 8:00 AM - noon

Organizer and Presenter:
 Prof. Rodger E. Ziemer, *University of Colorado at Colorado Springs*

The overall goal of this tutorial is to present modulation and coding techniques important for understanding design trade-offs for wireless communication systems. It is important to understand the advantages and disadvantages that various multiple access, modulation, and coding approaches offer for their implementation. This tutorial will present an overview of the theory necessary for understanding approaches used for second generation systems and those being proposed for third generation systems to be fielded soon after the year 2000.

Exhibition

RAWCON'98 includes an exhibition (Tuesday 2:30 - 7 PM and Wednesday 7 AM - 4 PM). Booth and tabletop spaces may still be available. For information, please check the Web site or contact the Exhibition Chair, Michael Fennelly (tel: +1 978-667-4200 x18; fax: +1-978-667-8548; mfennelly@atn-microwave.com).



PANEL DISCUSSION SESSION

LMDS: JUMPSTARTING THE INDUSTRY
 Tuesday, August 11, 1998 7:00 - 9:00 PM

Organizers:
 Roger Marks, *National Wireless Electronics Systems Testbed (N-WEST)*, *NIST*
 Sanjay Kasturia, *Raychem Corp.* (Moderator)

Panelists:
 Marc Leclair, Vice President/Engineering, *Baker Creek Communications*
 Mohammad Shakouri, *Lucent Technologies, Inc.*, *Wireless Broadband Network Division*
 Leland Langston, *Raytheon TI Systems*
 Narisa Chu, *C&W Systems, Ltd.*; Chief Technical Consultant, *Cortelou Communications Corp.*
 Roger Marks, *National Wireless Electronics Systems Testbed (N-WEST)*

With the U.S. LMDS auctions complete, the largest block of spectrum ever licensed will soon be available to provide new services. To fully exploit the enormous potential of this 1.3 GHz of bandwidth, a number of players will have to come together and work cooperatively to address the special challenges of operating in this band. Currently, however the industry is fragmented at many levels. The licenses are in the hands of dozens of auction winners, many of whom are regional and only a few of which have experience in radio communications. Several major LMDS systems integrators have recently changed ownership, and the components required for operation in the 28-31 GHz band remain expensive.

License holders, component suppliers, and potential customers are best served by standardization. However, following recent trends, the U.S. government is leaving technology development and standardization for LMDS completely to the marketplace. No significant operational LMDS standards exist and, unlike the case of PCS, this industry cannot simply adopt, with minor modifications, the standards developed from another industry segment.

This panel discussion will feature speakers interested in proactive steps to bring about the development of a coherent LMDS industry.



REGISTRATION FORM

1998 IEEE Radio and Wireless Conference

August 9-12, 1998

Colorado Springs, CO, USA

<http://rawcon.org>

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Additional Copies of the Proceedings (on-site pickup)	\$70	\$90
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CANCELLATIONS

Cancellations will be refunded, less a \$50 processing fee, only if written notice is postmarked on or before August 1, 1998.

INCLUDED IN THE REGISTRATION FEE:

- With Technical Sessions (including Student/Retiree rate):** Admission to two and a half days of oral technical sessions as well as exhibition and poster sessions; full Conference Proceedings book with nearly 100 full papers; meals (Monday evening banquet plus breakfast and lunch on Tuesday and Wednesday); Monday and Tuesday evening receptions; five refreshment breaks.
- With Workshops:** Admission to full-day or half-day session; workshop notes; continental breakfast; lunch; refreshment break (two breaks for full-day workshop).
- With Panel:** Admission to panel session and exhibition; pre-panel reception, including two beverage tickets.

HOUSING

Accommodations should be secured directly with the Sheraton Colorado Springs at 1-719-576-5900. You may also fax your request to 1-719-576-7695, including name, address, fax number, arrival date, number of nights, conference name, credit card name, credit card number, and credit card expiration date. Rates are \$112 (single or double occupancy). Hotel cut-off date is July 8, 1998.

ADDITIONAL INFORMATION

Visit our web site at <http://rawcon.org>

MESSAGE FROM THE GENERAL CHAIR

I invite you to have a look at this Advance Program and see all that RAWCON'98 offers to engineers in the wireless industry:

- an interdisciplinary technical focus at the intersection between radio-frequency and communications engineering
- an outstanding technical program of 98 papers from 22 countries, selected by our international Technical Program Committee from a pool of 149 submissions
- a Banquet Address by Larry Irving, head of the U.S. National Telecommunications and Information Administration
- a Keynote Address on "Technical Challenges to LMDS Implementation" by Barclay Jones, Chief Technical Consultant with WNP Communications, Inc. LMDS is the new broadband wireless data and/or video service. WNP is by far the largest winner of spectrum in the recent U.S. LMDS auctions and is responsible for nearly one-third of the total auction income.
- a panel discussion session on LMDS featuring panelists who are building the industry
- tutorial workshops, featuring renowned experts, on two topics that wireless engineers *must* keep up with: (1) modeling for CAD and (2) coding and modulation
- an exhibition offering proximity to hundreds of international technical experts in wireless communications

Based on the tremendous response to our Call for Papers, we are projecting a large crowd. Nevertheless, we will continue to provide the congenial and interactive experience that we developed with the 1996 and 1997 Wireless Communications Conferences. The sessions remain on a single track, ensuring your exposure to a wide range of wireless technologies so that you advance your understanding on a broad front. In contrast to narrowly-focussed conferences and to those so large that they break into parallel sessions, RAWCON offers a forum for technical issues to be aired in front of not only peers and competitors but customers and suppliers as well. In addition, our comfortable poster sessions, exhibit sessions, breaks, and receptions give you a chance to meet the key people in the industry.

RAWCON'98 takes place at the fine Sheraton Colorado Springs. Colorado Springs is one of the world's most beautiful tourist destinations and home to many telecommunications businesses. Make sure to reserve your room before the July 8 cutoff date. The same deadline is your last chance for discounted early registration.

Keep an eye on rawcon.org for the latest updates and further details on the sessions as well as helpful conference and travel information. You can also find an electronic registration form there, and you can sign up for the RAWCON email list. I'm looking forward to seeing you in August.

Rock On!
—Roger

General Chair

Dr. Roger B. Marks
National Institute of Standards and Technology
325 Broadway, Mail Code 813.06
Boulder, CO 80303
tel: +1-303-497-3037 • fax: +1-303-497-7828
marks@nist.gov

Technical Program Chair

Dr. Michael S. Heutmaker, *Lucent Technologies*
P.O. Box 900
Princeton, NJ 08542-0900
tel: +1-609-639-3116 • fax: +1-609-639-3197
heutmaker@lucent.com

Exhibits Chair

Michael Fennelly, *ATN Microwave, Inc.*
85 Rangeway Road
North Billerica, MA 01862-2105
tel: +1-978-667-4200 x18
fax: +1-978-667-8548
mfennelly@atn-microwave.com

Registration Chair

George Jankovic, *RF Globalnet Website*
2955 Baseline Rd., Boulder, CO 80303
tel: +1-303-415-9233 • fax: +1-303-415-9238
george@mosco.com

Finance

Richard A. Sparks, *Anro Engineering*
Gerome R. Reeve, *NIST*

Local Arrangements

John G. McIlroy, *The MITRE Corporation*

Publicity

Thomas T. Y. Wong, *Illinois Institute of Technology*

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445 Hoes Lane, P. O. Box 1331
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